CONCRETE MASONRY

NATIONAL CONCRETE MASONRY ASSOCIATION

38 SOUTH DEARBORN STREET • CHICAGO 3, ILLINOIS

MODULAR DESIGN FOR GREATEST ECONOMY

Concrete masonry construction is most economical if designed to make greatest use of standard full and half-length units, and to require a minimum of cutting and fitting on the job. Modular wall designs, using modular-size window and door frames and modular concrete masonry units, are highly recommended for greatest saving in construction time and cost, and neatest appearance.

FOOTINGS

Footing widths and thicknesses for concrete masonry walls should conform to local building code requirements for expected loads. If no local building codes apply, it is a general rule to make footings for small buildings and retaining walls two times as wide and about equal in depth to the thickness of the walls they will support.

PROPER DRAINAGE

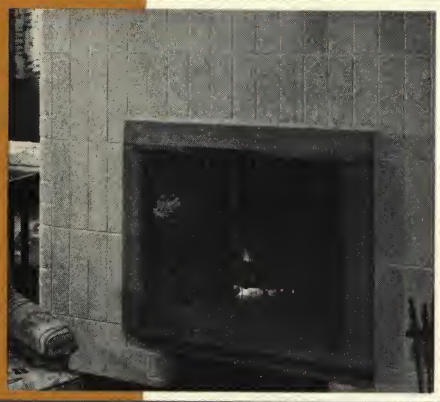
In areas where ground water during wet seasons is likely to rise above the footings or basement floor, it is recommended that drain tile be laid with open joints around the footing and drained (with slope of ½″ in 12′) to a suitable outlet. Excavation outside the walls should then be filled with gravel or crushed rock to a depth of at least 18 inches, and with earth backfill sloped away from foundation walls.

GOOD MORTAR JOINTS MEAN WEATHERTIGHT WALLS

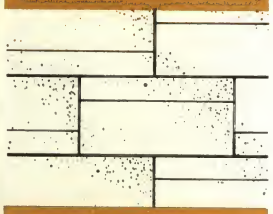
Full mortar bedding—with webs as well as face shells covered with mortar—is used in laying the first course of block on the footing or foundation, and also wherever maximum strength is required—such as piers and pilasters. Face shell bedding is used for most other work. It is important that enough mortar be used to fully cover the face shells. For most work, joints should be ⅜″ thick. Even with the best workmanship, some patching and pointing is usually necessary, and this should be done while mortar already in the wall is still fresh and plastic. Openings and cracks should be completely filled —not just concealed at the surface. Mortar is usually troweled off flush with the wall as each block is laid. Then, as soon as mortar has slightly stiffened, it should be compacted with a jointing tool—preferably one that produces a concave or V-shaped joint—to maintain close, weathertight bond between mortar and block. Application of two coats of cement-base paint gives additional protection against moisture for exterior walls.

LINTELS

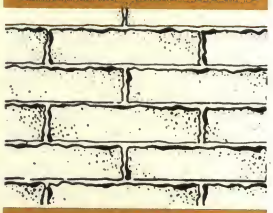
Properly designed lintels are vitally important to a sound concrete masonry structure, since they support the weight of the wall and other loads over windows and doors, and transmit these loads to the adjacent bearing wall sections. Pre-cast concrete, cast-in-place concrete, and reinforced concrete masonry lintels are all used satisfactorily in various types of concrete masonry construction.



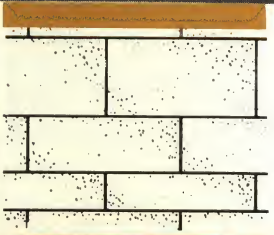
VERTICALLY STACKED
4″ x 16″ face size units for attractive basement fireplace.



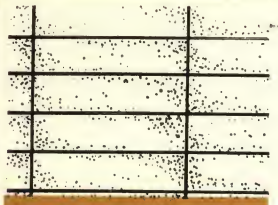
SCORED BLOCK
units combined with standard, half length block and concrete brick.



EXTRUDED MORTAR
Untrimmed excess mortar hardened to create casual appearance for exterior or interior walls.

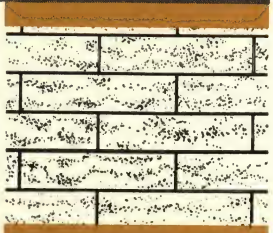


RUNNING BOND
4″, 6″ and 8″ high units with raked mortar joints produce sound absorbing walls.



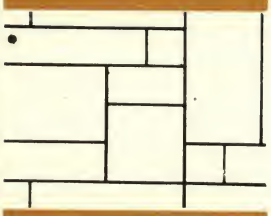
HORIZONTALLY STACKED

8" x 8" x 8" unit partition wall. 8" x 4" x 16" unit rear wall.



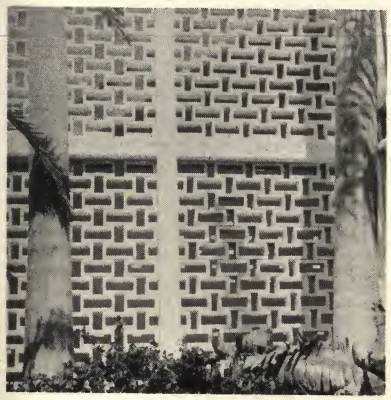
SPLIT BLOCK

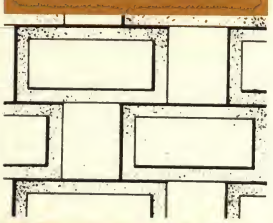
units split lengthwise exposing rugged, natural beauty of aggregates.



RANDOM ASHLAR

8" and 4" high units combined in distinctive ashlar pattern.





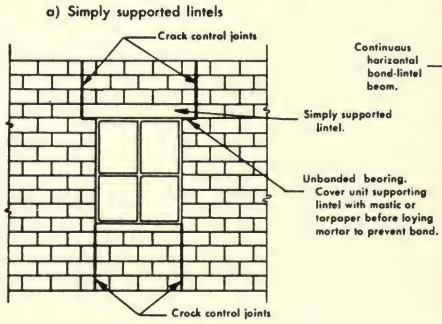
SINGLE CORE

Unusual, modern facade of 8" x 8" x 16" single core units.

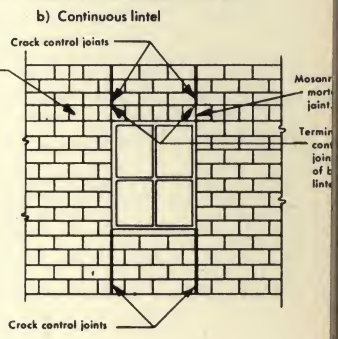
Control joints

Properly designed control or expansion joints provide a continuous vertical separation through the wall thickness, and also extend through any rigid wall finishes. These joints allow for any slight wall movement resulting from contraction and other stresses, and confine it to the control joint section of the wall. Where control joints are used, they are usually spaced about 20 ft. apart in exterior walls and in interior walls in unheated buildings . . . 15 to 20 feet apart in interior walls in heated buildings. Recommended location of control joints around openings, and two types of shear-resisting control joints are shown below.

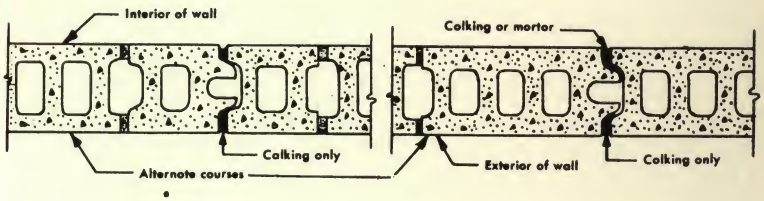
a - simply supported lintels


a) Simply supported lintels
Crack control joints
Simply supported lintel.
Unbanded bearing. Cover unit supporting lintel with mastic or tarpaper before laying mortar to prevent bond.
Crack control joints

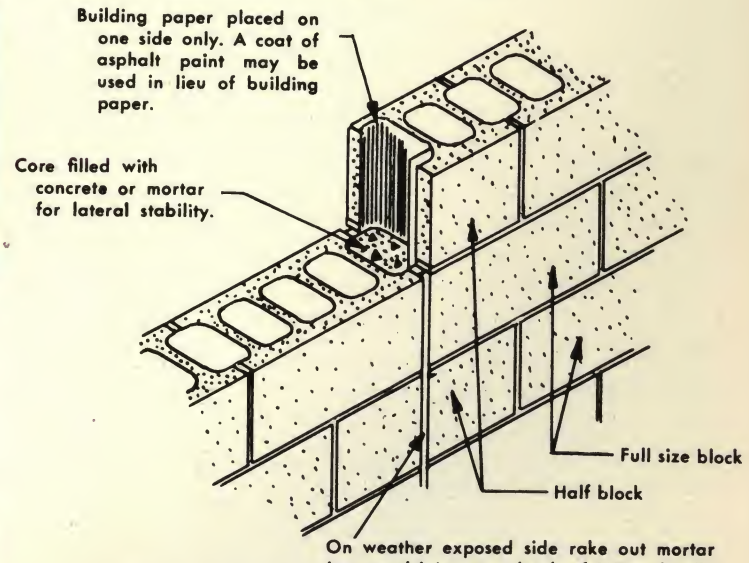
b - continuous lintel



c - detail of shear-resisting joint



d - detail of shear-resisting control joint


Building paper placed on one side only. A coat of asphalt paint may be used in lieu of building paper.
Core filled with concrete or mortar for lateral stability.
Full size block
Half block

On weather exposed side rake out mortar in control joint to a depth of ¾" and calk. Leave calking recessed ¼" below outer edges of joint. Calking may be omitted on interior face and joint finished by deeply grooving the mortar.

condensed specifications

GENERAL

The masonry contractor shall provide all materials and equipment required to complete the concrete footings and the concrete masonry walls (basement walls, exterior walls, partition walls, etc.) of the project in accordance with the plans and specifications. The work shall be properly coordinated with that of other trades. All local laws and ordinances applicable to the work shall be fully complied with.

MATERIALS

Concrete masonry units shall conform to the physical requirements of the local building code and the current, applicable A.S.T.M. specifications applying to the particular use or construction in which units are employed. Concrete masonry units shall be protected against wetting prior to laying in the walls.

CONSTRUCTION

1. All masonry walls shall be built to the thickness and to the bond or pattern and mortar joint treatment indicated on the plans.

2. Masonry contractor shall provide and place such special units as may be required to form all corners, returns and off-sets and maintain the proper bond.

3. Where interior concrete masonry partitions meet other interior partitions or exterior walls, a masonry bond or the equivalent in approved metal ties shall be provided.

4. Control joints and/or horizontal joint reinforcement shall be incorporated according to the details and locations shown on the plans. Joint reinforcement shall be of approved type.

5. Mortar for concrete masonry walls subject to average loading and exposure shall be made in the proportions of 1 volume of masonry cement and approximately 3 volumes of damp, loose mortar sand; or 1 volume of portland cement and 1 volume of hydrated lime or lime putty, and approximately 6 volumes of damp, loose mortar sand.

Mortar for foundation walls built of hollow concrete masonry units and mortar for concrete masonry walls above grade which will be subjected to extremely heavy loads, violent winds, earthquakes, severe frost action, or other conditions requiring extra wall strength shall be made in proportions of 1 volume of masonry cement plus 1 volume of portland cement and approximately 6 volumes of damp, loose mortar sand; or 1 volume of portland cement to which may be added up to ¼ volume of hydrated lime or lime putty, and approximately 3 volumes of damp, loose mortar sand.

6. Face shell bedding shall be used with complete coverage of face shells. Furrowing of the mortar shell shall not be permitted.

7. Mortar joints shall be ⅜ in. thick with full mortar coverage on vertical and horizontal face shells. Vertical joints shall be shoved tight.

8. Mortar joints for concrete masonry walls to be exposed or painted shall be struck off flush with wall surface and when partially set shall be firmly compacted with a pointing tool.

9. Mortar joints for concrete masonry walls to be plastered, stuccoed or used as back-up shall be cut flush with the face of the wall.

10. Backfilling against foundation walls shall not be permitted until first floor framing is in place.

11. Where shown on plans, concrete drain tile shall be laid with open joints around the footing and drained to a suitable outlet with a slope of ½ in. in 12 ft. In no case shall the tile be lower than the footing. Joints between the tile shall be covered with pieces of roofing felt to prevent sediment filling the tile during backfilling. The excavation outside the walls shall be filled with gravel or crushed rock to a depth of at least 18 in. Earth backfill above shall be sloped away from foundation walls to provide drainage from foundation.

12. The earth side of foundation walls shall be plastered ½ in. thick with the same mortar used in erecting these walls. At the junction of the outside wall face and footing, plaster coating shall be thickened and rounded to form a cove to divert water from the base of the wall.

13. At the conclusion of the masonry work, contractors shall remove mortar daubs, smears and clean down the walls, remove all scaffolding and equipment used in the work, clean up all debris and surplus material and remove same from premises.

about the association...

COMPRISED OF...

leading manufacturers of concrete masonry units in the United States, Canada, Hawaii, New Zealand, Puerto Rico, Japan, Venezuela and Alaska. A current list of member companies will be furnished upon request.

FUNCTION...

The function of the National Concrete Masonry Association, a non-profit organization, is to improve and extend the uses of concrete masonry through scientific research, the development of new or improved products and methods, technical guidance, promotion, and educational effort.

FACILITIES...

The National Concrete Masonry Association maintains an active and continuous research program geared to bring about more efficient manufacturing methods and quality improvements in concrete masonry units and structures. Its promotional efforts have resulted in a broad educational program, including the preparation of many informative publications designed to illustrate the latest and approved methods of concrete masonry construction.

special bulletins available

NCMA publishes many helpful design and technical aids for architects and engineers. Three of the newest are described below. These informative booklets can be obtained from your local NCMA member, or by writing directly to the Association.

LINTEL DESIGNS

A number of laboratory and job-site tested lintel designs especially recommended for use in concrete masonry construction are shown in the NCMA booklet, *Design and Construction of Lintels*. Designs include pre-cast concrete and cast-in-place concrete, as well as reinforced concrete masonry lintels. Design tables, safe load tables, load test results, suggested specifications, and recommended construction practices add further value to this booklet, which was an award-winner in the 1954 A. I. A.—Producers' Council competition in the technical literature division.

RETAINING WALL DESIGNS

A new NCMA booklet, *Reinforced Concrete Masonry Retaining Walls*, contains design details, recommendations on reinforcing and construction methods, sample calculations, and a report on recently completed load tests on retaining walls up to 10 feet in height.

NATIONAL CONCRETE MASONRY ASSOCIATION

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